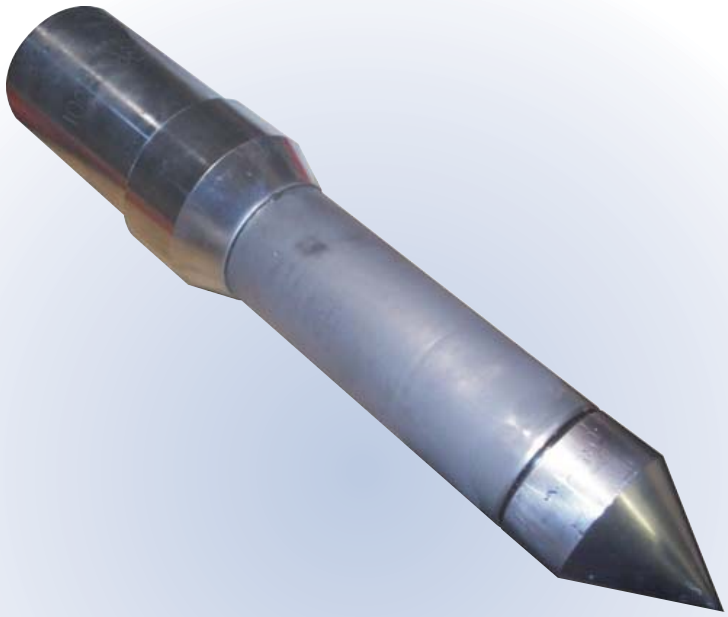
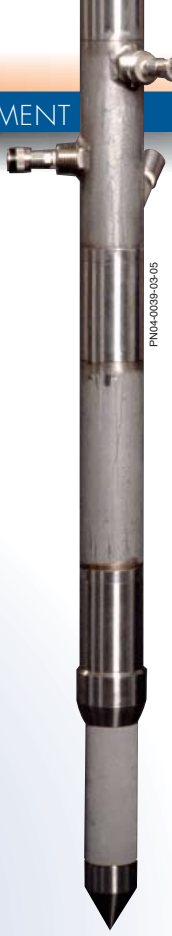
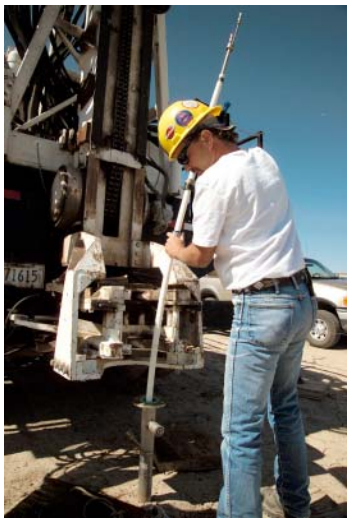
Single Probe Multiple Uses







Installing an instrument into the probe casing is safe and easy.

GEOPS - Geologic and Environmental Probe System

Science

INL Idaho National Laboratory

The INL has developed a multiple-use, low-cost, subsurface probing system that can safely sample and monitor any targeted subsurface area, especially abandoned or active landfills, mining areas, farms, airports, and many other sites. The system uses a unique probe casing that—once placed in a zone of interest—accepts any of several instrument inserts to provide valuable data from saturated or unsaturated zones.

New Subsurface Probe System

The Geologic and Environmental Probe System (GEOPS) is the newest generation of INL-developed subsurface probes. This new multiprobe monitoring system improves on previous probe designs, enabling the exchange of multiple inserts to collect different sets of environmental data from the same casing location. Specifically designed to use in the more than 300,000 identified waste sites across the U.S., the GEOPS system also expands the efficiency and flexibility of installing probes, protects sensitive instrument inserts, and lowers costs of collecting subsurface data in any zone of interest.

Continued on back

R&D 100 Award Winner for 2004!

R&D 100 Awards

Continued from front

Works With Variety of Sensors

A full suite of probes are available to perform specific functions and obtain valuable information about the fate and transport of contaminants or other environmental data through vadose and groundwater zones. This suite includes functions within the unsaturated zone (lysimeter, tensiometer, and vapor port probes) and the saturated zone (water sampling and water level measurement of groundwater), plus access in the casing for geophysical surveys. Other types of sensors also can be installed in the casing. These instrument inserts are fully retrievable, permitting the best instrument to be used for specific needs.

Faster and Cheaper Installation

The system's probe casing is installed to the desired depth using direct push or sonic drill rigs. These methods do not bring cuttings to the surface protecting workers and the surface environment from possible contamination. After the casing is set with the drill rig, an instrument is inserted into the casing and locked in place by hand. Once data is obtained, the instrument can be retrieved and a different instrument is inserted and locked into the same casing. Using this new probe system, field scientists can install probes five times faster than a similar number of earlier-style probes. Depending on the nature of the data to be collected, the system can be adjusted for differing field conditions and a wide variety of waste zone profiles. GEOPS is adaptable also for rotary drilling if surface cuttings do not need to be avoided.

Isolation From Hazards

Many earlier probe systems were placed in pre-drilled holes and backfilled. Pre-drilling not only produces potentially hazardous cuttings at the surface—possibly endangering personnel—it also influences resulting data by disturbing soil and waste. To eliminate these problems, GEOPS uses a probe casing that is robust enough to be placed directly into or below a waste zone, isolating the surface from hazards and preserving existing subsurface conditions.

Powerful Waste Characterization

This new probing system is uniquely flexible in that it can characterize and monitor conditions in saturated and unsaturated soils or wastes. The system can pull liquid or vapor for analysis, or collect soil tension data. This flexibility offers immense value in determining options for contaminant retrieval or stabilization.

Low Cost and Long Life

The GEOPS system uses lower cost components and avoids the cost of fabricating different external probe casings to accommodate different instruments. The hollow casing's simple design allows multiple uses, shortens installation schedules, eliminates generation of secondary waste, and reduces costs across the board. The technology is designed for a long life, and once sufficient characterization data has been collected, the instruments can be retrieved and reused at other casing locations.

Specific Benefits

- No exposure to personnel during installation or operation; no fugitive dust
- Accelerates schedule: installation is five times faster
- Flexible, versatile, and reusable: "universal" drive probe with multiple inserts enables measuring and sampling different subsurface variables using the same casing at the same location
- Can be used in place of conventional probe systems to gather environmental data
- Can be placed in or below landfills, unknown materials, waste zones, etc.
- Instruments can be quality-checked during and after installation and during operation.

For more information

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